UNIT	Unit Title	Recommended Instructional Days
3	**Computer Programming and Design Thinking with Sphero indi and Ozobot Evo**	Trimester 3

Disciplinary Concept:	**Practice:**	**Recommended Activities, Investigations, Interdisciplinary Connections, and/or Student Experiences to Explore NJSLS-CSDT within Unit**
CS DA AP ED	Fostering an Inclusive Computing and Design Culture Collaborating Around Computing and Design Recognizing and Defining Computational Problems Creating Computing Artifacts Testing and Refining Computational Artifacts Communicating About Computing and Design	
Core Idea:	**Performance Expectation/s:**	
Individuals use computing devices to perform a variety of tasks accurately and quickly. Computing devices interpret and follow the instructions they are given literally. A computing system is composed of software and hardware. Describing a problem is the	8.1.2.CS.1: Select and operate computing devices that perform a variety of tasks accurately and quickly based on user needs and preferences. 8.1.2.CS.2: Explain the functions of common software and hardware components of computing systems. 8.1.2.CS.3: Describe basic hardware and software problems	**Essential Question/s:** How do the different parts of an indi robot help it to see, move, and light up? When we measure things (like color tiles), how does it help us make sure things happen in the right order and turn out the way we want? Why is it important to know how the different parts of an Ozobot work? How can we use colors and lines to make an Ozobot move?

first step toward finding a solution when computing systems do not work as expected. Computers store data that can be retrieved later. Data can be copies, stored in multiple locations, and retrieved. Data can be used to make predictions about the world. Individuals develop and follow directions as part of daily life. A sequence of steps can be expressed as an algorithm that a computer can process. Real world information can be stored and manipulated in programs as data (e.g., numbers, words, colors, images). Complex tasks can be broken down into simpler instructions, some of which can be broken down even further. People work together to develop programs for a purpose, such as expressing ideas or addressing problems. The development of a program involves identifying a sequence of events, goals, and expected outcomes, and addressing errors (when necessary).	using accurate terminology. 8.1.2.DA.2: Store, copy, search, retrieve, modify, and delete data using a computing device. 8.1.2.DA.3: Identify and describe patterns in data visualizations. 8.1.2.AP.1: Model daily processes by creating and following algorithms to complete tasks. 8.1.2.AP.2: Model the way programs store and manipulate data by using numbers or other symbols to represent information. 8.1.2.AP.4: Break down a task into a sequence of steps. 8.1.2.AP.5: Describe a program's sequence of events, goals, and expected outcomes. 8.1.2.AP.6: Debug errors in an algorithm or program that includes sequences and simple loops. 8.2.2.ED.3: Select and use appropriate tools and materials to build a product using the design process. 8.2.2.ED.4: Identify constraints and their role in the engineering design process.	**Activity Description:** Meet Sphero indi (access prior knowledge). Reintroduce indi and identify and discuss its parts and their functions. Power on indi and place it on a green tile, and allow students to observe using their senses (Review Lesson 1: Meet Sphero indi). Use indi color tiles to measure distance and predict how far indi will travel. This activity should be conducted in an empty hallway or gym. Introduce the lesson by having students explore measurement. Model how to use color tiles to measure (Measuring: Lesson 1: Simple Distances). Measure the distances between each color tile of different puzzles to make sure indi can make it all the way around. (Measuring: Lesson 2: Measuring a Maze). Working in groups/teams, create a new path for indi. Brainstorm new ideas using paper and colors (Measuring: Lesson 3: Where are you going?). Become robot explorers and get to know our new robot friend, Evo! Use a special "Evo Explorer" sheet to help find and label all the cool hardware parts on Evo, like its wheels, lights, and sensors. Explore Evo's parts, watch it move and do different things, discussing what we expect Evo to do and how we think it will feel to touch (Introduction to Ozobot: Get to know Evo). Use the activity sheets to calibrate the Ozobot and use symmetric and asymmetric codes to program the Ozobot. Allow time for students to wrap up the activity by answering the reflection questions provided (Introduction to Color Codes 01: Basic Training). Engage students in discussion about bird migration to North America. Discuss how climate change affects bird migration. With a partner, guide

Engineering design is a creative process for meeting human needs or wants that can result in multiple solutions Limitations (constraints) must be considered when engineering designs.		Ozobots north, mimicking the real-life spring migration, using speed and special move color codes (Lesson Plan: The Spring Migration). Ozobot is late for school and needs your help getting there as fast as possible without getting distracted! Use color code directions to navigate Ozobot's path to school (Lesson Plan: Late for School!). **Interdisciplinary Connections: Content:** ELA RL.2.1; NJSLSA W.7; NJSLSA.SL.1; NJSLA.SL2; SL.2.6 NGSS.K.LS1-1; NGSS.1.LS1-1
Social and Emotional Learning: ***Competencies***	**Social and Emotional Learning:** ***Sub-Competencies***	

Self Awareness Self-Management Social Awareness Responsible-Decision Making Relationship Skills	• Recognize one's personal traits, strengths, and limitations • Recognize the importance of self-confidence in handling daily tasks and challenges • Understand and practice strategies for managing one's own emotions, thoughts, and behaviors • Recognize the skills needed to establish and achieve personal and educational goals • Recognize and identify the thoughts, feelings, and perspectives of others • Demonstrate an understanding of the need for mutual respect when viewpoints differ • Develop, implement, and model effective problem-solving and critical thinking skills • Identify the consequences associated with one's actions in order to make constructive choices • Establish and maintain healthy relationships • Utilize positive communication and social skills to interact effectively with others • Identify ways to resist inappropriate social pressure	

	• Identify who, when, where, or how to seek help for oneself or others when needed	

Assessments (Formative) ***To show evidence of meeting the standard/s, students will successfully engage within:***	**Assessments (Summative)** ***To show evidence of meeting the standard/s, students will successfully complete:***
Formative Assessments: • Exit Slips • Quizzes • Self Assessments/Reflection • Lesson Activity Worksheets	**Benchmark:** • Performance Assessment **Summative Assessments:** • District/Department Assessments

Differentiated Student Access to Content:
Teaching and Learning *Resources/Materials*

Core Resources	**Alternate Core Resources** ***IEP/504/At-Risk/ESL***	**ELL Core Resources**	**Gifted & Talented Core Resources**
• Sphero indi classroom pack & Educator Guide Book • Department-created lesson plans • Ozobot Curriculum Guide	• Reteaching worksheets • Spanish version of lesson activities	Dictionary for native language	Enrichment/Extension activities

Supplemental Resources

Technology:
- Chromebooks, MacBook
- Projector
- Interactive board
- Ozobots
- indi robots
- NASA Global Climate Change

Other:

- Google Classroom
- GAFE
- Pens, Pencils, Crayons, Markers
- Activity Sheets (Sphero indi, Ozobots)

Differentiated Student Access to Content:
Recommended *Strategies & Techniques*

Core Resources	**Alternate Core Resources** ***IEP/504/At-Risk/ESL***	**ELL Core Resources**	**Gifted & Talented Core**
● Deliver instruction utilizing varied learning styles including audio, visual, and tactile/kinesthetic, provide individual instruction as needed, modify assessments and/or rubrics, repeat instructions as needed.	● Special Education: Adhere to IEP/504s Utilize a multi-sensory (VAKT) approach during instruction, provide alternate presentations of skills by varying the method (repetition, simple explanations, additional examples, modeling, etc.), modify test content and/or format, allow students to retake test for additional credit, provide additional times and preferential seating as needed, review, restate and repeat directions, provide study guides, and/or break assignments into segments of shorter tasks.	● Extend time requirements, preferred seating, positive reinforcement, check often for understanding/review, oral/visual directions/prompts when necessary, supplemental materials including use of online or paper bilingual dictionary, and modified assessment and/or rubric.	● Provide extension activities related to the topic being discussed. Create an enhanced set of introductory activities, integrate active teaching/learning opportunities, incorporate authentic components, propose interest-based extension activities, and connect students to related talent development opportunities.

NJSLS CAREER READINESS, LIFE LITERACIES & KEY SKILLS	**Disciplinary Concept:**

	Core Ideas:	• **Brainstorming can create new, innovative ideas** • **Critical thinkers must first identify a problem then develop a plan to address it to effectively solve the problem.** • **Digital tools can be used to display data in various ways.** • **A variety of diverse sources, contexts, disciplines, and cultures provide valuable and necessary information that can be used for different purposes.** • **Digital tools have a purpose.** • **Collaboration can simplify the work, an individual has to do and sometimes produce a better product.**
	Performance Expectation/s:	**9.4.2.CI.2; 9.4.2.CT.1; 9.4.2.CT.3; 9.4.2.IML.2; 9.4.2.IML3; 9.4.2.TL.1; 9.4.2.TL.7**
	Career Readiness, Life Literacies, & Key Skills Practices	
	• **Act as a responsible and contributing community members and employee.** • **Consider the environmental, social and economic impacts of decisions.** • **Demonstrate creativity and innovation** • **Utilize critical thinking to make sense of problems and persevere in solving them** • **Use technology to enhance productivity, increase collaboration and communicate effectively** • **Work productively in teams while using cultural/global competence**	

New Jersey Legislative Statutes and Administrative Code (place an "X" before each law/statute if/when present within the curriculum map)									
	Amistad Law: *N.J.S.A. 18A 52:16A-88*		Holocaust Law: *N.J.S.A. 18A:35-28*		LGBT and Disabilities Law: *N.J.S.A. 18A:35-4.35*		Diversity & Inclusion: *N.J.S.A. 18A:35-4.36a*	X	Standards in Action: *Climate Change*